

What is claimed is:

1. A method of forming an inductive device in an integrated circuit comprising:
forming a shield layer;
patterning the shield layer into sections of shield that are generally symmetric to a plane of symmetry, wherein portions of some of the sections of shield are patterned perpendicular to the plane of symmetry as they cross the plane of symmetry;
forming a layer of dielectric overlaying the sections of shield;
depositing a first layer of metal overlaying the dielectric layer; and
patterning the first layer of metal to form one or more pairs of current path regions that are generally symmetric about the plane of symmetry such that each current path region pair has one current path region on one side of the plane of symmetry and another current path region on the other side of the plane of symmetry.
2. The method of claim 1, wherein each one of the one or more pairs of current path regions are patterned to form a generally regular polygonal shape.
3. The method of claim 1, further comprising:
forming conductive straps between the shield layer and the first layer of metal approximate select sections of shield; and
forming a connection between the conductive straps and the select sections of shield to provide an alternate less resistive path for each of the select sections of shield, wherein the conductive straps are coupled across a length of the select sections of shield.
4. The method of claim 1, further comprising:
coupling the shield to an external AC ground along the plan of symmetry.

5. The method of claim 1, wherein forming the layer of shield further comprising:
depositing a third metal layer; and
patterning the third metal layer to form the sections of shield.
6. The method of claim 5, wherein the third metal layer is deposited on a working surface of a substrate.
7. The method of claim 5, wherein the third metal layer is deposited on a layer of dielectric that is formed on a working surface of a substrate.
8. The method of claim 1, wherein forming the layer of shield further comprising:
doping a substrate to form a conducting layer that is more conductive than adjacent material.
9. The method of claim 8, further comprising:
forming trenches in the substrate to pattern the layer of shield into the sections of shield.
10. The method of claim 1, further comprising:
forming a first lead to a current path region of a first pair of current path regions;
and
forming a second lead to another current path region of the first pair of current path regions portion, wherein the first lead is symmetric to the second lead about the plane of symmetry.
11. The method of claim 10 further comprising:
forming a third lead to a current path region of a second pair of current path regions; and

forming a fourth lead to another current path region of the second pair of current path regions portion, wherein the third lead is symmetric to the fourth lead about the plane of symmetry.

12. The method of claim 10, further comprising:
coupling a center tap to a second pair of current path regions along the plane of symmetry; and

coupling an external AC ground to the center tap.

13. The method of claim 12, further comprising:
coupling a conducting path to each of the sections of shield along the plane of symmetry.

14. The method of claim 13, further comprising:
coupling the conducting path to the center tap.

15. The method of claim 1, further comprising:
forming current routers to selectively route current from current path regions on a first side of the plane of symmetry to current path regions on a second side of the plane of symmetry.

16. The method of claim 15, wherein the method of forming each current routers further comprises:

forming an overpass in the first metal layer;

coupling the overpass between a first current path region in a first pair of current path regions on a first side of the plane of symmetry and a first current path region in a second pair of current path regions on the second side of the plane of symmetry;

forming an underpass in a second metal layer, the second metal layer is positioned between the sections of shield and the first metal layer; and

coupling the underpass between a second current path region in the first pair of current path regions on the first side of the plane of symmetry and a second current pass region in the second pair of current path regions on the second side of the plane of symmetry.

17. A method of forming a symmetric inducting device for an integrated circuit, the method comprising:

patterning one or more pairs of current path regions in a main metal layer that overlays a working surface of a substrate of an integrated circuit, wherein each pair of current path regions are patterned to be generally symmetric about a plane of symmetry that is perpendicular to the working surface of the substrate; and

forming current routers having an overpass and an underpass to selectively couple one current path region in a pair of current path regions to another current path region in another pair of current path regions, wherein a width of the overpass is formed narrower than the width of the underpass to approximate resistances through the overpass and the underpass.

18. The method of claim 17, further comprising:

coupling a first lead to a select current path region in a pair of current path regions on one side of the plane of symmetry; and

coupling a second lead to the other select current path region of the pair of current path regions on the other side of the plane of symmetry, wherein an AC current source can be coupled across the first and second leads.

19. The method of claim 17, further comprising:

coupling a center tap to a select pair of current path regions along the plane of symmetry, wherein an external AC ground can be coupled to the center tap.

20. The method of claim 17, wherein the current routers are formed on the plane of symmetry.

21. The method of claim 17, wherein the method of forming each current router further comprises:

- patterning the overpass from the main metal layer;

- coupling the overpass between a first current path region in a first pair of current path regions and first current path region in a second pair of current path regions;

- patterning the underpass from a second metal layer that is positioned between the substrate and the main metal layer; and

- coupling the underpass to a second current path region in the first pair of current path regions and a second current path in the second pair of current path regions.

22. The method of claim 21, wherein the width of the overpass is formed narrower than the width of associated current path regions coupled to the overpass and the width of the underpass is formed wider than the width of associated current path regions coupled to the underpass.

23. The method of claim 21, further comprising:

- patterning at least one pair of capacitor compensation regions for each current router from the second metal layer on opposite sides of an associated underpass to approximate the parasitic capacitance created by the underpass;

- coupling one of the at least one pair of capacitor compensation regions on one side of the underpass to the first current path region of the first pair of current path regions; and

- coupling a second one of the at least one pair of capacitor compensation regions on another side of the underpass to the first current path region of the second pair of current path regions.

24. The method of claim 17, further comprising:
forming a shield layer of relatively conductive material, the shield layer is formed between the main metal layer and a second surface of the substrate that is opposite the working surface of the substrate; and
patterning the shield layer to form sections of shield that are symmetric to the plane of symmetry.
25. The method of claim 24, wherein portions of select segments of shield are patterned perpendicular to the plane of symmetry as the portions cross the plane of symmetry.
26. The method of claim 25, wherein some of the select segments of shield that have portions that are perpendicular to plane of symmetry are further patterned to have end portions that extend from the perpendicular portions at predetermined angles.
27. The method of claim 24, further comprising:
coupling the sections of shield to an external AC ground along the plane of symmetry.
28. The method of claim 24, further comprising:
coupling the sections of shield to a metal line along the plane of symmetry.
29. The method of claim 28, further comprising:
coupling the metal line to the center tap.
30. A method of forming a symmetric inducting device for an integrated circuit comprising:
forming a shield layer;

patterning the shield layer to form sections of shield that are generally symmetric to a plane of symmetry, wherein at least a mid portion of most sections of shield are perpendicular to the plane of symmetry;

forming metal straps from at least one interior metal layer, wherein the at least one interior metal layer is formed a select distance from the sections of shield;

coupling termination ends of each of the metal straps to an associated select section of shield, wherein each strap extends along the mid portion of an associated select section of shield; and

forming a plurality of current path regions from a main metal layer, the at least one interior metal layer is positioned closer to the shield layer than the main metal layer, the plurality of the current path regions are generally symmetric to the plane of symmetry.

31. The method of claim 30, wherein the plurality of current path regions are generally formed in pairs of generally regular polygonal shape regions that are symmetric about the plane of symmetry.

32. The method of claim 30, wherein metal straps are not formed between a current path region and a section of shield.

33. The method of claim 30, wherein at least one of the metal straps is formed between a current path region and an associated section of shield, wherein the at least one metal strap is essentially at AC ground.

34. The method of claim 30, wherein forming each metal strap for the at least one interior metal layer further comprising:

forming the termination ends of the metal strap wider than a mid portion of the metal strap.

35. The method of claim 30, wherein coupling the termination ends of each metal strap further comprising:
- selectively forming vias through a layer of dielectric that overlays the sections of shield;
 - forming conductive contacts in the vias; and
 - forming the metal straps over laying the layer of dielectric, wherein the termination ends of each metal strap are coupled to an associated section of shield by associated conductive contacts.
36. The method of claim 30, wherein forming the layer of shield further comprises:
- introducing dopants into the substrate to form a layer of shield that is more conductive than areas directly adjacent the formed layer of shield.
37. The method of claim 36, further comprising:
- forming trenches in the substrate to pattern the layer of shield into the sections of shield.
38. A method of forming an inductive device in an integrated circuit comprising:
- forming a shield layer;
 - patterning the shield layer into segments of shield that are symmetric about a plane of symmetry;
 - forming a conductive halo a select distance from the shield layer, the halo extending around an outer perimeter of the segments of shield;
 - patterning at least one gap in the conducting halo, wherein the conducting halo is symmetric about the plane of symmetry;
 - coupling the conductive halo to each of the sections of shield;
 - forming a main metal layer, wherein the halo is positioned between the main metal layer and the shield layer; and

patterning the main metal layer to form at least one pair of generally regular polygonal current path regions, wherein the at least one pair of current path regions are generally symmetric about the plane of symmetry.

39. The method of claim 38, wherein two gaps are patterned in the halo to form two sections of halo which are symmetric about the plane of symmetry.

40. The method of claim 38, wherein the at least one gap is positioned along the plane of symmetry.

41. The method of claim 38, wherein forming the shield further comprising:
introducing dopants into a substrate to form a shield layer that is more conductive than adjacent material;
etching trenches through the shield layer to form a desired pattern; and
filling the trenches with insulating material.

42. The method of claim 38, further comprising:
forming current routers having an overpass and an underpass to selectively couple one current path region in a pair of current path regions to another current pass region in another pair of current path regions.

43. The method of claim 42, wherein a width of the overpass is less than the width of the underpass to approximate similar resistances in the overpass and underpass.

44. A method of forming an inducting device, the method comprising:
forming a shield layer;
forming a main metal layer a select distance from the shield layer;
patterning the main metal layer into one or more current path regions;

forming one or more current routers to couple current path regions to each other, each current router having an overpass and an underpass;

forming one or more capacitor compensation sections for each current router; and

coupling each capacitor compensation section to an overpass of an associated current router to approximate parasitic capacitance of an underpass of the associated current router to the shield.

45. The method of claim 44, wherein each capacitor compensation section is formed generally at the same vertical depth as the underpass of the associated current router.

46. The method of claim 44, wherein each capacitor compensation section is formed between the main metal layer and an underpass of the associated current router.

47. The method of claim 44, wherein each capacitor compensation section is formed between an underpass of the associated current router and the shield layer.